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UNITED STATES DEPARTMENT OF AGRICULTURE
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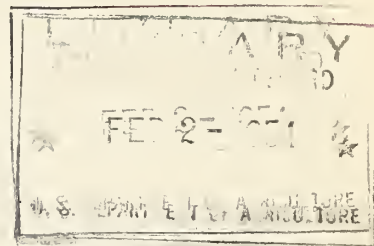
Y LIST OF PUBLICATIONS AND PATENTS

of the
Northern Regional Research Laboratory
Peoria, Illinois

January - June 1953

- - -

PUBLICATIONS



[Publications marked (*) are not available for distribution]

LIPIDS.

J. C. Cowan and H. E. Carter

Pages 178-242 of book entitled "Organic Chemistry," Vol. III, Chapter III. John Wiley and Sons, Inc., New York, N. Y., 1953.

The organic chemistry of lipids, including distribution of acids, polymorphism, oxidation, polymerization, isomerization, hydrogenation, addition reactions, synthetic glycerides, and minor constituents, is discussed.

NUT SHELLS--ASSETS OR LIABILITIES.

T. F. Clark.

43rd Annual Report, 1952, Northern Nut Growers Association, pp. 77-81, 1953.

The value of nut shells as materials for agricultural and industrial use is discussed. Problems of plant location, shell collection, processing, and hazards are considered. Applications and specifications are illustrated.

EFFECT OF ALCOHOLS ON THE MYCOLOGICAL PRODUCTION OF CITRIC ACID IN SURFACE AND SUBMERGED CULTURE. I. NATURE OF THE ALCOHOL EFFECT.

Andrew J. Moyer.

Appl. Microbiol. 1(1): 1-7. January 1953.

It was found that the production of citric acid was greatly stimulated by the use of 1 to 4 percent by volume of methanol or ethanol as adjuncts to the fermentation of glucose by various strains of *Aspergillus niger* in either surface or submerged culture. Methanol was more effective than ethanol which could be assimilated and converted to citric acid. Effectiveness of the alcohols was increased by medium acidification. Effective methanol concentration was related to amount and age of inoculum. Calculated on the basis of glucose consumed, 70 percent yields, by weight, of anhydrous citric acid were obtained in 9 days.

EFFECT OF ALCOHOLS ON THE MYCOLOGICAL PRODUCTION OF CITRIC ACID IN SURFACE AND SUBMERGED CULTURE. II. FERMENTATION OF CRUDE CARBOHYDRATES.

Andrew J. Moyer,

Appl. Microbiol. 1(1): 7-13. January 1953.

By the use of methanol as an adjunct to the culture medium, good yields of citric acid were obtained from *Aspergillus niger* with commercial glucose, ground corn and cornstarch; beet, blackstrap, and "high test" molasses in both surface and submerged cultures. No special purification was necessary with these crude carbohydrate sources. Incubation temperatures influenced the optimum level of nutrients. Economies in the preparation and amount of inoculum were effected. Procedures are given for a deep-tank fermentation of commercial glucose to citric acid.

A NEW COLOR METHOD FOR DIFFERENTIATING BRAN AND GERM PARTICLES FROM INSECT FRAGMENTS IN FLOUR

R. A. Larkin, M. M. MacMasters, and C. E. Rist.

Cereal Chem. 30(1): 54-58. January 1953.

A new method is described for the differentiation of bran and germ particles from insect and larval fragments in wheat flour. It consists essentially of dispersing most of the starch and protein with 0.6 N sodium hydroxide, partially neutralizing with hydrochloric acid, filtering through a wire screen, submerging the screen and retained particles in 0.025 percent Crystal Violet solution for 15 minutes and observing the fragments in the solution by transmitted light. The bran and germ particles are stained deep violet, while the insect and larval fragments appear bright orange-red. Insect and larval fragments so small as to be identified by structural details only with difficulty are easily distinguished by this method.

THE RETURN OF BIREFRINGENCE TO GELATINIZED STARCH GRANULES.

M. M. MacMasters.

Cereal Chem. 30(1): 63-65. January 1953.

The birefringence exhibited by ungelatinized starch granules is lost when the granules are heated in water. Granules which had been heated in water from 10° to 15° C. above the temperature at which they had lost all visible birefringence regained birefringence in their outer portions upon addition of iodine solution to the suspension. Waxy starch granules did not regain birefringence. Both ethanol and pinacyanole solution acted like iodine solution in causing return of birefringence. In addition, ethanol caused a considerable shrinkage of the granules. The observations suggest that the disorganization of starch granule structure which occurs during gelatinization is to a certain extent reversible.

ALCOHOL WATER INJECTION FOR FARM TRACTORS

John D. Hummell and Richard Wiebe.

U. S. Dept. Agri. AIC 349, 12 pp (Processed.) February 1953.

Under a research contract with the Northern Regional Research Laboratory, the Department of Agricultural Engineering of the Ohio Agricultural Experiment Station at Columbus, Ohio, arranged and supervised cooperative tests with a number of farmers involving a total of 50 tractors. Compression ratios of these tractors varied from 5.3:1 to 8:1. The results showed that increase in power and smoothness of operation was of more importance to the farmers than the savings in fuel. It was possible to handle heavier loads and at times to operate in a higher gear ratio with a saving in time. Twenty-three of the 25 tractors in which the compression ratio was increased for the test program will continue to be used by the farmers.

THE AMADORI REARRANGEMENT UNDER NEW CONDITIONS AND ITS SIGNIFICANCE FOR NON-ENZYMATIC BROWNING REACTIONS.

John E. Hodge and Carl E. Rist.

Jour. Amer. Chem. Soc. 75(2): 316-322. January 20, 1953.

The Amadori rearrangement of glycosylamine derivatives to 1-desoxy-1-amino-2-ketose derivatives was demonstrated to occur (1) slowly in the solid state on storage at 25° C. and (2) rapidly in hot alcoholic solution in the presence of compounds containing active methylenic hydrogen atoms. These new conditions gave crystalline 1-desoxy-1-amino-2-ketose derivatives from glycosyl derivatives of secondary alkylamines, of a primary alkylamine, and of a primary aromatic amine. 1-Desoxy-1-piperidino-D-fructose in aqueous solution with amino acids produced brown substances much more rapidly at 25° C. than did D-glucose or N-D-glucosylpiperidine at the same pH. The other desoxyaminoketoses also gave rapid browning reactions with amino acids. Since the Amadori rearrangement occurs spontaneously in N-glycosides in the dry state, and the products of the rearrangement undergo rapid browning reactions with amino acids, a mechanism for nonenzymatic browning in sugar-amine systems based on the Amadori rearrangement is proposed.

ELABORATION OF A SUBTENOLIN-LIKE ANTIBIOTIC BY BACILLUS PUMILUS.

William Dvornch and Robert G. Benedict.

Antibiotics and Chemotherapy 3(2): 192-194. February 1953.

A strain of *Bacillus pumilus* has been found to produce an antibiotic apparently identical with subtenolin, a *Bacillus subtilis* antibiotic. The *B. pumilus* antibiotic can be produced and isolated in the same manner as subtenolin. It has the same antibiotic spectrum, solubilities, and stabilities as subtenolin.

By paper chromatography using a number of solvents, no differentiation is shown between the two antibiotics.

ENZYMATIC SYNTHESIS OF DEXTRAN. ACCEPTOR SPECIFICITY AND CHAIN INITIATION.

H. J. Koepsell, H. M. Tsuchiya, N. N. Hellman, A. Kazenko, C. A. Hoffman,

E. S. Sharpe, and R. W. Jackson.

Jour. Biol. Chem. 200(2): 793-801. February 1953

A survey of a large number of sugars and sugar derivatives indicated that isomaltose, maltose, α -methylglucoside, and glucose can act as efficient alternate glucosyl acceptors and also initiate chain formation when present during enzymatic conversion of sucrose to dextran. These sugars increased reaction rate. In contrast to normal dextran synthesis, the process in the presence of efficient alternate acceptors led to extensive oligosaccharide formation and simultaneous growth of many dextran chains. Fructose, leucrose, melibiose, and galactose also appeared to act as glucosyl acceptors, but were much less efficient. The oligosaccharides produced appeared to comprise the series to be expected from successive addition of glucose by α -1,6-glucopyranosidic linkage on the alternate acceptor. Formation of leucrose and a second fructose containing disaccharide was enhanced by presence of fructose as auxiliary sugar.

GRAIN STRUCTURE AND GRAIN STORAGE.

M. M. MacMasters.

U. S. Dept. Agr. AIC-348 11 pp. (Processed.) February 1953.

Existing information on the structure and storage of cereal grains is reviewed. The structure of the grain is a major factor to be considered in drying, and also explains the common presence of molds within the kernels. Grain at a moisture content above that in

equilibrium with air at 74 percent relative humidity is liable to mold and heat in storage. Improper artificial drying may lower the value of the grain both for feeding and for industrial use; "safe" drying conditions depend upon the kind of grain and the purpose for which it is to be used.

NUT SHELLS AND FRUIT PITS--THEIR COMPOSITION, AVAILABILITY, AGRICULTURAL AND INDUSTRIAL USES.

T. F. Clark and E. C. Lathrop.

U. S. Dept. Agr. AIC-352, 39 pp. (Processed.) February 1953.

The production, availability, composition, and physical characteristics of shells from almonds, coconuts, filberts, peanuts, pecans, English and black walnuts, and the pits from apricots, cherries, peaches, and dates are discussed. Agricultural and industrial uses for the various types of shell products are described. Factors involved in processing shells for commercial purposes are considered.

ESTERS OF 1,4,7-TRIHIDROXYALKANES.

Charles R. Russell, Herbert E. Smith, L. S. Hafner, and L. E. Schniepp.

Jour. Amer. Chem. Soc. 75(3): 726-727. February 5, 1953.

The preparation and properties of the tri-esters of 1,4,7-heptanetriol, 1,4,7-octanetriol, and of 1-tetrahydrofuryl-3,6,9-nonanetriol with the even-numbered fatty acids from C_2 to C_{10} are described. Twenty-two such esters were prepared, purified by extraction and by high vacuum distillation, and the physical properties of the pure products were determined. The trihydroxyalkanes from which these esters were prepared are derived by hydrolytic hydrogenation reactions from furfural-condensation products and are described in a previous publication.

FACTORS AFFECTING MOLECULAR WEIGHT OF ENZYMATICALLY SYNTHESIZED DEXTRAN.

H. M. Tsuchiya, N. N. Hellman, and H. J. Koepsell.

Jour. Amer. Chem. Soc. 75(3): 757-758. February 1953.

Dextran of high molecular weight is synthesized enzymatically in reaction mixtures containing initially 10 percent sucrose; low molecular weight polymer is formed in 70 percent sucrose. At intermediate sucrose levels a bimodal distribution of molecular weight of dextran is found. Alternate glucosyl acceptors also affect the molecular weight of dextran synthesized. Acceptors such as maltose, when present in reaction mixtures, induce the formation of dextran with average molecular weight of 35,000; low molecular weight dextran induces formation of dextran with molecular weight in the clinical range.

CONTROLLED THERMAL DEPOLYMERIZATION OF DEXTRAN.

Ivan A. Wolff, Paul R. Watson, John W. Sloan, and Carl E. Rist.

Indus. and Engin. Chem. 45(4): 755-759. April 1953.

The high molecular weight dextran formed by *Leuconostoc mesenteroides* NRRL B-512 was degraded by heat under a variety of conditions of time and temperature. At 200° C. a product can be prepared which is in the molecular size range now considered useful for blood volume expanders. The degraded dextrans were separated into more homogeneous fractions by a solvent-precipitation procedure, and preliminary deductions concerning their molecular structure were made by examining the products and their fractions for reducing power, viscosity, optical rotation, acidity, light-scattering weight, average molecular weight, and for the ratio of 1,6- to non-1,6-glucosidic linkages, as determined by periodate oxidation techniques. The mechanism of heat degradation of dextran is discussed and related to the mechanism of pyrodextrin formation from starch.

THE FLAVOR PROBLEM OF SOYBEAN OIL. XI. PHYTIC ACID AS AN ACTIVATING AGENT FOR TRACE METALS.

C. D. Evans, Patricia M. Cooney, Helen A. Moser, and A. W. Schwab.
Jour. Amer. Oil Chem. Soc. 30(4): 143-147. April 1953.

Phytic acid, the hexaphosphoric acid ester of inositol, when added to edible oils, effectively combined with and inactivated the dissolved pro-oxidant metals. The addition of amounts as low as 0.005 percent prevented the deleterious effects of metals on soybean oil during high temperature steam deodorization. This acid was effective in preventing the oxidative effects of added iron, copper, or calcium salts. Oxidative and organoleptic evaluation data are presented for cottonseed oil and various soybean oil samples treated with phytic acid, both in the presence and absence of added metals.

RECENT PROGRESS AT THE BAIC REGIONAL RESEARCH LABORATORIES.

Reid T. Milner.
Chemurg. Digest 12(4): 17-20. April 1953.

The role of research on utilization and its intimate relationship to other agricultural research is discussed. Following up on a summary of 10 years of research presented the year before, the more recent progress in the 4 laboratories of the Bureau of Agricultural and Industrial Chemistry is reported in the fields of cereal and forage crops, cotton, fruit, sugar and special plants, poultry, animal products, and agricultural residues.

THE STRUCTURE OF THE CORN KERNEL.

M. M. MacMasters.
Amer. Miller and Processor 82(4): 38-40. April 1953.
(A synopsis of "Structure of the Mature Corn Kernel, I-IV," Cereal Chem. 29(5): 321-382, September 1952, and U. S. Dept. Agr. AIC-348, "Grain Structure and Grain Storage," listed above.)

CRYSTALLINE SODIUM LACTOBIONATE MONOHYDRATE.

George E. N. Nelson and Frank H. Stodola.
Jour. Amer. Chem. Soc. 75(7): 1748-1749. April 5, 1953.

Heretofore the study and utilization of the bionic acids have been hampered by the lack of salts which could be readily purified by crystallization. It has now been found possible to obtain crystalline sodium lactobionate monohydrate in a stable and easily filterable form.

ANTIBIOTICS PRODUCED BY ACTINOMYCETES.

R. G. Benedict.
Bot. Rev. 19(5): 229-320. May 1953.

This is an alphabetical classification of approximately 82 actinomycetous antibiotics, with reference to their more important chemical, physical, and biological properties. Other aspects of the review include: (1) Numerical data on antagonistic actinomycetes isolated from naturally occurring materials; (2) antagonistic properties of species within the 4 genera considered; and (3) the practical applications of vitamin B₁₂ antibiotic supplementation in the feeding of nonruminant animals. The arbitrary classification of the antibiotics covered was devised to separate naturally pigmented substances on the basis of solubilities and nonpigmented substances according to chemical characteristics, insofar as they are known. Structural formulas are shown for 11 antibiotics. The review is accompanied by 5 tables and 288 literature citations.

THE FLAVOR PROBLEM OF SOYBEAN OIL. XII NITROGEN COORDINATION COMPOUNDS EFFECTIVE IN EDIBLE OIL STABILIZATION.

A. W. Schwab, Patricia M. Cooney, C. D. Evans, and J. C. Cowan.
 Jour. Amer. Oil Chem. Soc. 30(5). 177-182. May 1953.

The activity attributed to acid activators or synergists in edible oils is explained on the basis that these materials are metal deactivators. They function through their ability to form typical Werner coordination compounds. The complexing of the metal in the form of a metal coordination chelate prevents the trace metals from acting as oxidation catalysts. The order of effectiveness of the coordinating atom, the functional groups necessary, and the arrangement of these groups within the coordinating molecules are explained, and the effects of different variations discussed. The results obtained through the use of nitrogen coordinating compounds in edible vegetable oils and in hydrogenated oils are presented.

SOYBEANS. A SELECTED LIST OF REFERENCES.

Nellie G. Larson and John C. Cowan
 U. S. Dept. Agr., AIC 355 10 pp. (Processed.) May 1953.

A selected list of references to the literature on soybeans compiled for use by non-specialists and laymen.

STATUS OF RESEARCH ON THE "REVERSION" OF SOYBEAN OIL SHORTENING.

J. C. Cowan
 Symposium on "Stability of Shortenings in Cereal and Baked Products," published by the Research and Development Associates, Food and Container Institute, Inc., Chicago, Illinois, pp. 27-35. May 1953.

A review of the flavor stability of soybean oil with emphasis on hydrogenated soybean oil including unpublished work showing differences between hydrogenated soybean and cottonseed oil is presented.

STUDIES ON VITAMIN B₁₂ PRODUCTION WITH STREPTOMYCES OLIVACEUS.

Harlow H. Hall, Robert G. Benedict, Carl F. Wiesen, Carolyn E. Smith,
 and Richard W. Jackson.
 Appl. Microbiol. 1(3): 124-129. May 1953.

Some effects of media, temperature, aeration, etc., on the synthesis of vitamin B₁₂ in fermentations with *Streptomyces olivaceus* NRRL B 1125 were determined. When grown in submerged aerated culture, relatively large quantities of this vitamin are formed which make *S. olivaceus* useful for the large scale manufacture of vitamin B₁₂ concentrates for the enrichment of feeds. Feeding tests show the fermentation product to be a good source of vitamin B₁₂ for chicks.

ESTERS OF γ -(TETRAHYDRO-2-FURYL)-ALKANOLS.

C. R. Russell, L. S. Hafner, H. E. Smith, and L. E. Schniepp.
 Jour. Amer. Chem. Soc. 75(9) 2161-2162. May 5 1953.

The preparation and properties of esters derived from 3-(tetrahydro-2-furyl)-1-propanol, 4-(tetrahydro-2-furyl)-2-butanol, and 1,5-bis(tetrahydro-2-furyl)-3-pentanol with fat acids from C₂ to C₁₈ and with aliphatic dicarboxylic acids from C₆ to C₁₀ are described.

SUGGESTED SPECTROPHOTOMETRIC METHODS FOR GRADING GREEN SOYBEAN OIL.

Eugene H. Melvin, Duncan Macmillan, and Frederic R. Senti.

Jour. Amer. Oil Chem. Soc. 30(6): 255-259. June 1953.

To determine whether a simple spectrophotometric method could replace the present visual method for grading green, crude, soybean oil, the oil was extracted from soybeans which had been frozen at various stages of maturity. These oils were graded according to the National Soybean Processors Association visual method for green crude oil grading. To provide a continuous scale using this method, the depth of nickel-sulphate solution required to match one inch of oil was determined in a Duboscq colorimeter. Good correlation was obtained between optical densities of the crude oils measured spectrophotometrically and the Duboscq colorimeter readings. A spectrophotometric grading system, therefore, can be devised readily for crude, green oil. To explore the possibility of grading processed oil according to green color, spectrophotometric and Duboscq colorimetric measurements were also made on the green oils after refining and after refining and bleaching. In both cases, good correlation was found between optical density and nickel-sulphate readings. There is poor correlation, however, of the nickel-sulphate readings on a crude oil with optical densities of the same oil after refining or after refining and bleaching. Therefore, for grading at the refined or refined and bleached stages of processing, new breakpoints between oil grades would have to be defined.

ADVANCED FOOD PROCESSING WITH IMPROVED FATS AND OILS. 3. SOY OIL FLAVOR STABILIZED WITH METAL INACTIVATORS.

J. C. Cowan

Food Engin. 25(6): 103. June 1953.

Metallic impurities such as iron and copper speed the appearance of off-flavors in most fat products and particularly in soybean oil. Metal-inactivating compounds, such as phytic and citric acids, and new deodorizers constructed or clad with comparatively inert metals, substantially reduce the deleterious effect of the metal. Combinations of the inactivating compounds and new deodorizers give still further improvement. Structures of inactivating agents are discussed.

HETEROKARYOSIS IN ASPERGILLUS.

Kenneth B. Raper and Dorothy I. Fennell.

Jour. of the Elisha Mitchell Scientific Soc. 69(1): 1-29. June 1953.

Experiments have shown that different mutants of *Aspergillus fonsecaeus* when grown in paired culture are capable of producing heterokaryons, that is, mycelia which contain nuclei of two different types. Genetically, such mycelia express the characteristics of both parents (mutants). The strain studied most intensively produces good yields of gluconic and citric acids under suitable conditions of growth. It is believed that the phenomenon observed may offer a possible approach to the improvement of strains for fermentative processes since it is theoretically possible to produce two mutants each having some desirable characteristic enhanced, and if these can be combined a heterokaryotic or mixed culture might be produced which would exhibit the equivalent of hybrid vigor.

STATUS OF RESEARCH ON THE FLAVOR PROBLEM OF SOYBEAN OIL AT THE NORTHERN REGIONAL RESEARCH LABORATORY.

H. J. Dutton, C. D. Evans, and J. C. Cowan.

Transactions (American Association of Cereal Chemists) 11(2): 116-135. June 1953.

A discussion of the reversion problem is presented which integrates studies of odor precursors, autoxidation, trace metal deactivation, glyceride structure, odor isolations and identifications, and organoleptic procedures. The implications of these studies for the improved processing of soybean oil and for planning lines of future research are presented.

REPUBLICATIONS

THE AMERICAN PAPER INDUSTRY NEEDS STRAW AND BAGASSE.

S. I. Aronovsky.

Yearbook of The American Pulp and Paper Mill Superintendents Association, 33rd Annual Edition, Pp. 213, 215, 217, 219, 221, 223, 225, 227. 1952.

[Previously published in Paper Trade Jour. 134(26): 68, 70, 72, 74, 76, 78, 80, 82, June 27, 1952. and in Paper Mill News 75(26): 120-122, 124, 126, 128, 130, 131, 150, June 28, 1952.]

NUT SHELLS, INDUSTRIAL RAW MATERIALS.

T. F. Clark.

The Nutshell (Newsletter of the Northern Nut Growers Association, Inc.) 5(2): 14-15. January 1953.

[Condensation of "Nut Shells--Assets or Liabilities," 43rd Annual Report. Northern Nut Growers Association, pp 77-81, 1953, listed above.]

PULPS FROM STRAW AND SUGARCANE BAGASSE FOR MANUFACTURE OF NEWSPRINT.

E. C. Lathrop.

TAPPI 36(1): 142A-144A. January 1953.

[Previously published as U. S. Dept. Agr. AIC-327, January 1952; Indian Pulp and Paper VII(1): 57-59, July 1952.]

TRIUNFA LA TUSA.

E. C. Lathrop and T. F. Clark.

La Hacienda 48(1): 42-43. January 1953.

[Rewrite of "More Cob Processing Plants," Chemurg. Digest 11(9): 4-8, September 1952.]

VARNISHES AND PAINTS FROM SOYBEANS.

A. J. Lewis.

Paint Indus. Mag. 68(2): 7-10. February 1953.

[Previously published in Yearbook of Agriculture, 1950-1951, U. S. Department of Agriculture, pp 569-574.]

CORNCOBS--THEIR COMPOSITION, AVAILABILITY, AGRICULTURAL AND INDUSTRIAL USES.

T. F. Clark and E. C. Lathrop.

U. S. Dept. Agr. AIC-177 (Rev.). 67 pp. April 1953.

[Previously published as AIC-177, December 1947]

RECENT ADVANCES IN PULPING STRAW IN THE UNITED STATES.

S. I. Aronovsky.

TAPPI 36(4). 167A-171A. April 1953.

[Previously published as U. S. Dept. Agr. AIC-324, December 1951, and in Tropical Woods and Agricultural Residues as Sources of Pulp (A Symposium) (A book of papers presented at the FAO Technical Committee on Wood Chemistry, Appleton, Wisconsin, September 1951) pp. 178-189, December 1952, Rome, Italy]

CONTRACT RESEARCH PUBLICATIONS

(NRRL research under contract with outside agencies)

THE EFFECT OF THE CRUST ON THE STALING OF BREAD.

W. G. Bechtel, D. F. Meisner, and W. B. Bradley, American Institute of Baking.

(A report of work done under contract with the U. S. Department of Agriculture and supervised by the Northern Regional Research Laboratory of the Bureau of Agricultural and Industrial Chemistry.) Cereal Chem. 30(2): 160-168. March 1953.

PUBLICATIONS CONTAINING NRRL CONTRIBUTIONS

METHODS AND COSTS OF PRODUCING ALCOHOL FROM GRAIN BY THE FUNGAL AMYLASE PROCESS ON A COMMERCIAL SCALE.

Production and Marketing Administration and Bureau of Agricultural and Industrial Chemistry.

U. S. Dept. Agr. Tech. Bul. 1024, 38 pp. August 1950.

The report is a detailed discussion of plant-scale tests on the production and utilization of fungal amylase in lieu of malt for conversion of grain mash to produce ethyl alcohol. More exact information is given on investment costs of a fungal-amylase plant to operate in conjunction with a distillery of given capacity, the feasibility of producing pure culture mold fermentations on a large scale in a distillery, the process operations required in the alcohol plant when fungal amylase is substituted for barley malt, the yields and quality of alcohol and byproducts obtained when the fungal-amylase process is employed, and the comparative production costs of alcohol made from grain converted with fungal amylase and with barley malt. These investigations were conducted under a contract between the Production and Marketing Administration, U. S. Department of Agriculture, and the Grain-Processing Corporation, Muscatine, Iowa. Because the mold process was developed at the Northern Regional Research Laboratory, Bureau of Agricultural and Industrial Chemistry, personnel at that laboratory served as consultants to the contractor during the investigations, and prepared the publication. The report includes cost estimates and conclusions based on results of the experimental work.

PATENTS

[These patents are assigned to the Secretary of Agriculture. Copies of patents
may be purchased from the U. S. Patent Office, Washington, D. C.]

STABILIZATION OF GLYCERIDE OILS WITH STARCH PHOSPHATES.

John C. Cowan and Cyril D. Evans.

U. S. Patent 2,626,951. January 20, 1953.

The oxidative stability of vegetable oils is increased by the addition of small amounts of starch phosphates.

ACTIVATION AND ESTERIFICATION OF AMYLACEOUS POLYSACCHARIDES.

Rolland L. Lohmar Jr.

U. S. Patent 2,627,516. February 3, 1953.

Starch organic esters are produced by activating the starch prior to esterification by heat treatment with pyridine or picoline.

METHOD OF BONDING SHEET MATERIALS AND COATING COMPOSITIONS THEREFOR.

John C. Cowan, Lee Bert Falkenburg and Arthur J. Lewis.

U. S. Patent 2,630,397. March 3, 1953.

Polyamides are made by the chemical reaction of polymeric fat acids with certain diamines. The fat acids are obtained from vegetable oils, such as soybean oil. The product is useful in coating compositions and in adhesives. Of particular value are coating compositions possessing heat-sealing properties and possessing properties of markedly reduced moisture-vapor transfer.

METHOD FOR THE PREPARATION OF UNDEVITALIZED WHEAT GLUTEN.

Richard L. Slotter and Joseph A. Delap.

U. S. Patent 2,631,379. March 17, 1953.

Wheat gluten as it occurs in process for separating wheat starch, is difficult to dry satisfactorily because of its sticky character. According to this process a ribbon of 0.030 inch thickness is passed through a chamber in contact with air heated to 1/50° F. to 200° F. and dried to a moisture content of 4 percent to 7 percent. The dried ribbon has an acetic-acid solubility of 70 percent to 75 percent and is suitable for pulverizing and packaging.

PREPARATION OF PROTEINACEOUS SOYBEAN MATERIAL USING ISOPROPANOL.

Paul A. Belter, Allan K. Smith, Harold J. Deobald, Philip A. Singer, and Arthur C. Beckel.

U. S. Patent 2,635,094. April 14, 1953.

Gelsoy, a gelable protein substance from soybeans, is prepared by washing hexane-extracted flakes with isopropanol and subsequently extracting the washed flakes with water.

STERILIZATION OF STARCH SPONGE.

Majel M. MacMasters.

U. S. Patent 2,635,943. April 21, 1953.

Starch sponge, useful in internal surgical dressings, is sterilized by conventional steam procedure. It is prevented from reverting to a horny state by drying immediately to a state of crispness.

ANTIOXIDANT FOR FATS AND FATTY OILS.

Arthur W. Schwab and Herbert J. Dutton.

U. S. Patent 2,636,887. April 28, 1953.

New chemical compounds, namely the long-chain fatty acid esters esterified with citric acid at the 2-hydroxyl group, are found to be effective stabilizing agents against autoxidation and flavor deterioration of fatty oils, particularly soybean oil. The compounds have a stabilizing effect similar to that of citric acid and have the additional advantage of greatly increased fat solubility.

MODIFIED SOYBEAN LECITHIN.

Edwin P. Jones and John C. Cowan.

U. S. Patent 2,636,889. April 28, 1953.

The dispersing properties of crude soybean lecithin are improved by reaction with an organic isocyanate, such as phenyl isocyanate or hexamethylene diisocyanate. The reaction is carried out at temperatures above 50° C. until the odor of isocyanate disappears from the reaction mixture. The products are generally waxy or granular in character, and form stable dispersions in water.

APPARATUS FOR CONDUCTING HISTOCHEMICAL REACTIONS.

Michael J. Wolf and Alfred F. Fitton.

U. S. Patent 2,637,632. May 5, 1953.

The invention relates to a device for treating small, fragile specimens in liquid media. It is a clamp-like device designed to hold securely a small reaction vessel and to protect it from injury. The vessel is held on a platform upon which a movable cover plate is pressed, the cover plate containing apertures for the addition or removal of liquid.

N-(3,4,6-TRIACETYL-D-GLUCOSYL) PIPERIDINE AND METHOD OF PREPARING SAME.

John E. Hodge.

U. S. Patent 2,637,727. May 5, 1953.

Crystalline N-(3,4,6-triacetyl-D-glucosyl) piperidine was isolated from the reaction of piperidine with pentaacetyl-D-glucopyranose. This new compound provided an easily prepared intermediate for the synthesis of two substituted glucose derivatives.

METHOD FOR DETERMINING INSECT PARTS IN CEREAL FLOUR.

Roger A. Larkin.

U. S. Patent 2,639,617. May 26, 1953.

The degree of contamination of cereal flour or flour products with insect parts is determined by first dispersing starch and cereal protein, reducing the alkalinity of the dispersion slightly by the addition of acid and separating the residue. The residue is then treated with Crystal Violet which imparts a red color to insect-part contaminants.

POLYAMIDE RESINS.

Howard M. Teeter and John C. Cowan.

U. S. Patent 2,641,593. June 9, 1953.

Unsaturated higher fatty acids or esters, and especially "monomeric distillate" are utilized as raw materials in the manufacture of synthetic resins. The process also utilizes citraconic and itaconic anhydrides. The resins are useful in coating compositions.

METHOD FOR DETERMINING BRAN IN CEREAL FLOUR.

Roger A. Larkin.

U. S. Patent 2,642,745. June 23, 1953.

Bran and germ particles are rendered easily visible by treating cereal flour or flour products with Crystal Violet solution. The treatment is followed by an alkaline decolorizing step. The alkaline step disperses and decolorizes starch, protein, and similar materials, while bran and germ particles remain colored. The colored particles may be collected on a white filter paper and the degree of refining determined by visual examination.

METHOD FOR THE PRODUCTION OF VITAMIN B₁₂ BY STREPTOMYCES OLIVACEUS.

Harlow H. Hall.

U. S. Patent 2,643,213. June 23, 1953.

Streptomyces olivaceus is cultivated in a nutrient medium containing assimilable carbon such as glucose or sucrose, assimilable nitrogen such as distillers solubles or protein meal, and a soluble salt of cobalt. At the end of the fermentation (approximately 2 to 3 days) the medium contains relatively large recoverable amounts of vitamin B₁₂. The concentrated culture liquor may be used to fortify feed or food material